SM 3H

6.5 Inverse Trigonometric Functions

Name _____ Date _____ Period _____

Find the exact value of each expression in terms of π without using a calculator or table.

1. $\sin^{-1}\left(\frac{-1}{2}\right)$
2. $\arcsin\left(\frac{1}{2}\right)$
3. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$
4. $\arccos\left(\frac{1}{2}\right)$
5. $\sin^{-1}(0)$
6. $\arccos\left(\frac{-\sqrt{3}}{2}\right)$

Find the exact value of each expression in degrees without using a calculator or table.

7. $\arcsin(-1)$
8. $\cos^{-1}\left(\frac{-\sqrt{2}}{2}\right)$
9. $\arcsin(0.5)$
10. $\arccos(-1)$
11. $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$
12. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

Find the exact value of each expression in terms of π without using a calculator or table.

13. $\tan^{-1}(-1)$
14. $\sec^{-1}(2)$
15. $\operatorname{arc}\csc(-2)$
16. $\cot^{-1}\left(\frac{1}{\sqrt{3}}\right)$
17. $\csc^{-1}\left(\frac{2}{\sqrt{3}}\right)$
18. $\operatorname{arc}\cot\left(-\sqrt{3}\right)$

Find the approximate value of each expression in radians using a calculator. Round answers to two decimal places.

19. $\arcsin(0.5682)$

20. $\sec^{-1}(-3.44)$

21. $\arctan\left(\frac{-2}{\sqrt{7}}\right)$

22. $\csc^{-1}\left(6.8212\right)$

23. $\operatorname{arccot}(-12)$

24. $\cos^{-1}(0.7392)$

Find each value for x in the interval $\left[0, \frac{\pi}{2}\right]$ that satisfies each equation. Do not use a calculator, write answer in terms of π.

25. $\sin x = \frac{1}{2}$

26. $\cos x = \frac{1}{2}$

27. $\tan x = 1$

28. $\sin x = \frac{\sqrt{2}}{2}$

29. $\sin x = \frac{\sqrt{3}}{2}$

30. $\cos x = \frac{\sqrt{3}}{2}$

Find the exact value of each composition without using a calculator or table. Write answer in terms of π.

31. $\tan\left(\arccos\left(\frac{1}{2}\right)\right)$

32. $\sin^{-1}\left(\cos\left(\frac{2\pi}{3}\right)\right)$

33. $\arcsin\left(\sin\left(\frac{3\pi}{4}\right)\right)$

34. $\cos^{-1}\left(\cos\left(\frac{3\pi}{2}\right)\right)$

35. $\sin^{-1}\left(\sin\left(\frac{5\pi}{6}\right)\right)$

36. $\sin\left(\csc^{-1}(-2)\right)$

Find an equivalent algebraic expression for each composition.

37. $\sin\left(\arccos\left(x\right)\right)$

38. $\cos\left(\arctan\left(x\right)\right)$

39. $\tan\left(\arcsin\left(x\right)\right)$

40. $\sec\left(\arctan\left(x\right)\right)$

In each case α is an angle such that $0° < \alpha < 90°$. Find α to the nearest tenth of a degree.

41. $\sin\alpha = 0.557$

42. $\cos\alpha = 0.06$

43. $\csc\alpha = 1.3$

44. $\sec\alpha = 3.9$

Review Exercises

Convert from degrees to radians or radians to degrees. Use the value of π found on a calculator and round answer to four decimal places, as needed. Show work using the correct conversion ratios.

45. $15°$

46. $200°$

47. $\frac{\pi}{6}$

48. 3π